

**LIFE CYCLE COST ANALYSIS****A. Definition**

Energy life cycle cost analysis (ELCCA) is a decision making tool for building owners and designers. The analysis accounts for initial costs associated with constructing or renovating a facility as well as the cost of owning and operating a facility over its useful life. The ELCCA report provides a method of evaluating the various energy systems so a building owner can select the best system for the building.

B. When Required

Public agencies are required by RCW 39.35 to have an ELCCA prepared when public funds are used to build and/or *operate* the following:

1. New major facilities, buildings, or additions that have 25,000 square feet or more of usable floor space.
2. Building renovations or modernizations that have 25,000 square feet or more of usable floor space, when the project cost divided by the building value is greater than 0.5 and the project affects the energy-using system(s).
3. Combinations (or multiples) of 1 and 2 above that will be built on the same site during any 12-month period are considered a single project. If the sum of the affected areas is equal to or greater than 25,000 square feet, an ELCCA is required.

When an ELCCA is not required, a Public Facility Energy Characteristics (PFEC) form shall be completed and filed for all projects greater than 5,000 sf.

C. ELCCA Process

The three major steps in the ELCCA process are analysis by a qualified analyst (see Chapter 4 for details), review of the report by a qualified reviewer (see Appendix C, the "Review Process Checklist") and approval of the report by the responsible agency.

The ELCCA process contains four separate submittals:

1. Work Plan,
2. Energy use simulation and economic analysis (the ELCCA report),
3. Addendum, and
4. Verification.

Each submittal is prepared at a different phase of the building design process. The submittal requirements vary with the method of compliance selected. All four submittals must be prepared by an architect or engineer licensed in the State of Washington. The analysis must be considered in the design of all major publicly owned or leased facilities.

D. Methods Of Compliance

All projects require an ELCCA work plan when the design team is preparing the schematic design. The work plan describes the basic elements of the building, including envelope components, lighting system, and preferred heating fuel choice.

Public agencies may choose from three methods to demonstrate compliance. These choices allow flexibility and eliminate most of the analysis for smaller, less complex projects.

1. Prescriptive Path

This path may be applied to smaller facilities (under 100,000 square feet) where all components (envelope, lighting, control, and mechanical systems) of the design meet the prescriptive standards that will provide low life cycle cost operation.



2. Prototypical Design.
This method has been developed for public agencies that wish to reuse a previous facility design. The new facility must be based on a previously approved design that has a detailed energy and life cycle cost analysis completed within the past four years. The analyst must show that the proposed design is substantially similar to the original facility.
3. Detailed Energy and Life Cycle Cost Analysis.
This method is the full analysis that has always been part of the ELCCA guidelines. A computer simulation and life cycle cost analysis of system options is required. These results are compiled in a written report recommending the final configuration for the building.

E. Fit With Building Design Phases

The ELCCA process must be complete, accurate, and timely to benefit the design team and the facility's decision makers. This section explains how the process should integrate with the phases of building design.

The ELCCA process from start to finish requires varying amounts of time, from several months to over a year for verification, and involves many people. The process can be broken down into the following tasks with the goals and responsibilities identified below.

1. Contractual Agreement Awarded for Schematic Design
The City may select as the ELCCA analyst, a member of the design team. If not, an ELCCA analyst will be selected before the design team begins its work.
2. Work Plan Developed
The ELCCA analyst prepares a work plan of potential energy saving options to be analyzed with input from the design team, ELCCA reviewer, owner, and electric and natural gas utilities. It is crucial during the work plan development to see that all viable options are considered. The ELCCA analyst prepares the work plan and submits it to the ELCCA reviewer who then reviews it with the analyst. The reviewer, may suggest additional options to be analyzed. Once the scope of work is agreed on, the ELCCA analyst begins the study.
3. Energy Use Simulation and Economic Analysis Conducted
It is important to complete this part of the ELCCA submittal prior to the beginning of design development stage so that any recommended changes can be easily incorporated into the design. At this point, the ELCCA reviewer may have questions about the energy use simulation or economic analysis and may comment on the report. The reviewer's comments should be addressed in a timely manner before proceeding to the next phase of design. Once these comments are addressed satisfactorily, the ELCCA analyst to the design team should present the report.
4. Addendum Submitted
The ELCCA analyst must submit an ELCCA Addendum a *minimum of eight weeks before* construction documents are released for bid. The addendum will identify any changes suggested by the design team or identified during the design process. The addendum must contain a revised ELCCA report, if there have been changes in the design that affect energy systems, a verification checklist, and a completed PFEC form.



5. Addendum Approved
The ELCCA reviewer will examine the addendum and any revised materials on energy use simulation and economic analysis that are submitted. Because the lack of compliance with guidelines may entail redesign and costly delays, it is important to obtain approval before preparation of working drawings.
6. Verification
The verification checklist should be completed as part of the punch list inspection prior to acceptance by the City.

F. Reference

The *Energy Life Cycle Cost Analysis Guidelines for Public Agencies*, June 1998.

For questions or assistance in preparing ELCCA's contact:

Washington State Department of General Administration

Division of Engineering and Architectural Services

ELCCA lead reviewer

206 General Administration Building

P.O. Box 41012

Olympia, Washington 98504-1012

Voice (360) 902-7198

Fax (360) 753-2848

For an official copy of the ELCCA guidelines, contact [ELCCA staff](#) at The Washington State Department of General Administration.

End of Appendix 1 - K